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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/555,097	11/02/2005	**Hiroyuki Handa**	061352-0111	9431

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EXAMINER	
TRAN, THANH Y	
ART UNIT	**PAPER NUMBER**
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Please find below and/or attached an Office communication concerning this application or proceeding.

The time period for reply, if any, is set in the attached communication.

Office Action Summary	Application No.	Applicant(s)	
	10/555,097	HANDA ET AL.	
	Examiner	Art Unit	
	THANH Y. TRAN	2892	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE *3* MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

1)☒ Responsive to communication(s) filed on *20 September 2007*.

2a)☐ This action is **FINAL**. 2b)☒ This action is non-final.

3)☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

4)☒ Claim(s) *1-41* is/are pending in the application.

4a) Of the above claim(s) _____ is/are withdrawn from consideration.

5)☐ Claim(s) _____ is/are allowed.

6)☒ Claim(s) *1-41* is/are rejected.

7)☐ Claim(s) _____ is/are objected to.

8)☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

9)☒ The specification is objected to by the Examiner.

10)☒ The drawing(s) filed on *02 November 2005* is/are: a)☒ accepted or b)☐ objected to by the Examiner.

Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).

Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).

11)☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

12)☒ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).

a)☒ All b)☐ Some * c)☐ None of:

1.☒ Certified copies of the priority documents have been received.

2.☐ Certified copies of the priority documents have been received in Application No. _____.

3.☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

1) ☒ Notice of References Cited (PTO-892)
2) ☐ Notice of Draftsperson's Patent Drawing Review (PTO-948)
3) ☒ Information Disclosure Statement(s) (PTO/SB/08) Paper No(s)/Mail Date *11/02/05, 09/20/07*.
4) ☐ Interview Summary (PTO-413) Paper No(s)/Mail Date. _____ .
5) ☐ Notice of Informal Patent Application
6) ☐ Other: _____.

DETAILED ACTION

Claim Objections

1. Claim 20 is objected to because of the following informalities: In claim 20, line 2, it's unclear as to what applicant means by "heat sink member is a heat sink circuit element"? since said heat sink member is a separate element attached/connected to the circuit elements. Does applicant mean that another heat sink member is a heat sink circuit element? Appropriate correction is required.

For purpose of examining, the examiner assumes that the module further comprising another heat sink member which is a heat sink circuit element.

2. Claim 28 is objected to because of the following informalities: In claim 28, lines 2-3, it's unclear as to what applicant means by "the heat sink circuit element is a laminated body composed of a capacitor and an inductor"? the same heat sink circuit element can not be two different elements. Does applicant mean that the heat sink circuit element is a laminated body composed at least one of a capacitor and an inductor? Appropriate correction is required.

For purpose of examining, the examiner assumes that the heat sink circuit element is a laminated body composed at least one of a capacitor and an inductor.

Claim Rejections - 35 USC § 103

3. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

> (a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negatived by the manner in which the invention was made.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

4. Claims 1-26, 28-30, and 35-41 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al (U.S. 6,865,089) in view of Inagaki et al (U.S. 2004/0160751).

As to claim 1, Ho et al discloses in figure 9 a module with built-in circuit elements, wherein a plurality of substantially two-dimensionally formed wirings (40A) are stacked with an electrically insulating material (36) interposed therebetween; and one or more circuit elements (12, 24) are electrically connected to the wirings (40A) and at least part of the circuit elements (12, 24) is embedded in the electrically insulating material (36); and wherein a heat sink member ("heat-dissipation sheet" 31) having higher thermal conductivity than that of the electrically insulating material (36) is included, and the heat sink member (31) and at least high heat generating circuit element (12) among the circuit elements (12, 24) overlap each other when viewed in a laminating direction of the wirings, the high heat generating circuit element (12) rising to higher temperature than other components (24) of the module, while the module is in use.

Ho et al does not disclose the electrically insulating material is made of a mixture containing at least a filler and an electrically insulating resin.

Inagaki et al discloses in figure 18 (C) a module comprising an electrically insulating material (233) is made of a mixture containing at least a filler and an electrically insulating resin ("resin filler", see paragraph [0308]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Ho et al by having an electrically insulating material that is made of a mixture containing at least a filler and an electrically insulating resin as taught by Inagaki et al for matching the coefficients of thermal expansion between the substrate/layer and the circuit elements/chips in the packaging module (see paragraphs [0308] & [0462] in Inagaki et al).

As to claim 2, Ho et al discloses in figure 9 a module with built-in circuit elements, wherein the heat sink member (31) and the high heat generating circuit element (12) are opposed to each other in the laminating direction of the wirings (40A).

As to claim 3, Ho et al discloses in figure 9 a module with built-in circuit elements, wherein the heat sink member (31) is disposed on a surface of the electrically insulating material (36).

As to claim 4, Ho et al discloses in figure 9 a module with built-in circuit elements, wherein the area of the heat sink member (31) is larger than that of the high heat generating circuit element (12) when viewed in the laminating direction of the wirings (40A).

As to claim 5, Ho et al discloses in figure 9 a module with built-in circuit elements, wherein the high heat generating circuit element (12) is disposed on a surface of the electrically insulating material (36).

As to claim 6, Ho et al discloses in figure 9 a module with built-in circuit elements, wherein the heat sink member (31) is electrically connected to the wirings (40A) (heat sink member 31 is electrically connected to wirings 40A via chip 12, metal pads 14, and metal parts 16).

As to claim 7, Ho et al discloses in figure 9 a module with built-in circuit elements, wherein an electrically conducting member (43) for electrically connecting the plurality of wirings (40A) to one another is disposed close to the electrically insulating material (36); and which has a portion where the electrically conducting member (43) and the heat sink member (31) are heat-conductively connected.

As to claim 8, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the electrically conducting member (43) is a through hole ("vias" 43, figure 8).

As to claim 9, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the electrically conducting member (43, figure 8) is an inner via hole.

As to claim 10, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink member (31) is in the form of a chip part.

As to claim 11, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink member (31) contains a metal ("Cu") as a chief component (see col. 3, lines 6-8).

As to claim 12, Ho et al in view of Inagaki et al does not disclose the heat sink member contains ceramics as a chief component. However, it would have been obvious to one having ordinary skill in the art at the time the invention was made to modify the module of Ho et al in view of Inagaki et al by using a heat sink member that contains ceramics as a chief component

for reducing frequency noises and/or reducing production cost, since it has been held to be within the general skill of a worker in the art to select a known material on the basis of its suitability for the intended used as a matter of obvious design choice. In re Leshin, 125 USPQ 416.

As to claim 13, 15, 19, 23, 35, 37, and 41, Ho et al in view of Inagaki et al does not disclose the thermal conductivity of the heat sink member is not less than three times that of the electrically insulating material; the distance between the high heat generating circuit element and the heat sink member exceeds 0 mm and is 0.5 mm or less; the thickness of the heat sink member is 0.1 mm or more and 1.0 mm or less; the area of the heat sink circuit element is larger than that of the high heat generating circuit element when viewed in the laminating direction of the wirings. However, the thermal conductivity of the heat sink member is not less than three times that of the electrically insulating material; or a distance that exceeds 0 mm and is 0.5 mm or less between the high heat generating circuit element and the heat sink member; the thickness of 0.1 mm or more and 1.0 mm or less for a heat sink member; and the area of the heat sink circuit element is larger than that of the high heat generating circuit element would have been obvious to an ordinary artisan practicing the invention because, absent evidence of disclosure of criticality for the range giving unexpected results, it is not inventive to discover optimal or workable ranges by routine experimentation. In re Aller, 220 F.2d 454, 105 USPQ 233, 235 (CCPA 1955). Furthermore, the specification contains no disclosure of either the critical nature of the claimed dimensions of any unexpected results arising therefrom. Where patentability is aid to be based upon particular chosen dimensions or upon another variable recited in a claim, the Applicant must show that the chosen dimensions are critical. See In re Woodruff, 919 F.2d 1575, 1578, 16 USPQ2d 1934, 1936 (Fed. Cir. 1990).

As to claim 14, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the high heat generating circuit element (12) and the heat sink member (31) are disposed such that the area of a portion where they overlap each other when viewed in the laminating direction of the wirings is 40% or more of the area of the high heat generating circuit element (12) when viewed in the laminating direction of the wirings (40A).

As to claim 16, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the high heat generating circuit element (12) and the heat sink member (31) are in close contact with each other through at least the electrically insulating material (18).

As to claims 17 and 39, Ho et al does not disclose at least one of the wirings is further located between the high heat generating circuit element and the heat sink member. However, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Ho et al in view of Inagaki et al by having the wirings located between the high heat generating circuit element and the heat sink member for electrically interconnecting the circuit elements located between the high heat generating circuit element and the heat sink member with the high heat generating circuit element and/or between the high heat generating circuit element and the heat sink member, Since it has been held that rearranging parts of an invention involves only routine skill in the art. In re Japikse, 86 USPQ 70.

As to claim 18, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink member (31) is thicker than the wirings (40A).

As to claim 20, Ho et al discloses in figures 8-9 a module with built-in circuit elements, further comprising another heat sink member which is a heat sink circuit element (24 can be a

heat sink circuit element), which is among said circuit elements (12, 24) and has higher thermal conductivity than the electrically insulating material (36); and wherein the heat sink circuit element (24) and the high heat generating circuit element (12) among the circuit elements (12, 24) overlap each other when viewed in a laminating direction of the wirings (40A), the high heat generating circuit element (12) rising to higher temperature than other components (24) of the module, while the module is in use.

As to claim 21, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink circuit element (24) and the high heat generating circuit element (12) are opposed to each other when viewed in the laminating direction of the wirings (40A).

As to claim 22, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink circuit element (24) is disposed on a surface of the electrically insulating material (36).

As to claim 24, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the high heat generating circuit element (12) is disposed on a surface of the electrically insulating material (36).

As to claim 25, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink circuit element (24) is a resistor (see col. 3, lines 8-11).

As to claim 26, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink circuit element (24) is a capacitor (see col. 3, lines 8-11).

As to claims 28-30, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink circuit element (24) is a capacitor and is located in the vicinity of the high heat generating circuit element (12).

Ho et al does not teach the heat generating circuit element is a laminated body composed at least one of a capacitor and an inductor; or a ceramic capacitor.

Inagaki et al discloses in figure 18 (C) a module comprising a heat generating circuit element (220) that is a laminated body composed of at least one of a capacitor and an inductor; or a ceramic capacitor (see figure 18 (C) and paragraph [0308]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Ho et al by having a heat sink circuit element that is a ceramic capacitor as taught by Inagaki et al for reducing the wiring inductance and/or enhancing the reliability for the packaging module (see paragraphs [0004] & [0139] in Inagaki et al).

As to claim 36, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the high heat generating circuit element (12) and the heat sink circuit element (24) overlap each other such that the overlapping area when viewed in the laminating direction of the wirings (40A) is 40% or more of the area of the high heat generating circuit element (12) when viewed in the laminating direction of the wirings (40A).

As to claim 38, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the high heat generating circuit element (12) is in close contact with the heat sink circuit element (24) through at least the electrically insulating material (36).

As to claim 40, Ho et al discloses in figures 8-9 a module with built-in circuit elements, wherein the heat sink circuit element (24) is thicker than the wirings (40A).

5. Claims 27 and 32-34 are rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al (U.S. 6,865,089) in view of Inagaki et al (U.S. 2004/0160751) as applied to claims 1 and 20 above, and further in view of Tanaka et al (U.S. 6,498,553).

As to claims 27, 32, 33, and 34, Ho et al in view of Inagaki et al does not disclose the heat sink circuit element is an inductor having a laminated structure composed of windings and a magnetic substance and takes the form of a thin sheet; wherein the windings are sheet-like coils formed by plating, and the magnetic substance comprises at least a thin metallic body.

Tanaka et al discloses in figures 1-6 a heat sink circuit element is an inductor having a laminated structure ("laminated type inductor" 41) composed of windings ("the winding direction of the coil conductors") and a magnetic substance ("magnetic sheets" 43-46/(48-52)) and takes the form of a thin sheet; wherein the windings are sheet-like coils formed by plating, and the magnetic substance comprises at least a thin metallic body ("coil conductors" 63-71) ("magnetic sheets" 43-46/48-52 comprising "coil conductors" 63-71) (see figures 1-6, col. 2, lines 7-33 & 61-67, and col. 3, line 1 - col. 4, line 12). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Ho et al in view of Inagaki et al by using an inductor having a laminated structure composed of windings and a magnetic substance as taught by Tanaka et al for eliminating frequency noises for the module (see col. 1, lines 10-16, and col. 3, lines 40-57 in Tanaka et al).

6. Claim 31 is rejected under 35 U.S.C. 103(a) as being unpatentable over Ho et al (U.S. 6,865,089) in view of Inagaki et al (U.S. 2004/0160751) as applied to claims 26/28, 20 and 1 above, and further in view of Nakatani et al (U.S. 2004/0158980).

As to claim 31, Ho et al in view of Inagaki et al does not disclose a capacitor is a solid electrolytic capacitor.

Nakatani et al in figures 1-8D a passive component is a solid electrolytic capacitor (see paragraph [0028]). Therefore, it would have been obvious to a person having ordinary skill in the art at the time the invention was made to modify the module of Ho et al in view of Inagaki et al by using a solid electrolytic capacitor as taught by Nakatani et al for reducing frequency noises and/or providing a high reliability with respect to stress, and a built-in module that is excellent in a thermal radiation property (see paragraphs [0009] & [0011] in Nakatani et al).

Conclusion

7. The prior art made of record and not relied upon is considered pertinent to applicant's disclosure.

Matsuo et al (U.S. 7,057,896) discloses power module and production method.

Lin (U.S. 7,045,391) discloses multi-chips bumpless assembly package and manufacturing method.

Cole, Jr. et al (U.S. 5,745,984) discloses method for making an electronic module.

Ogawa et al (U.S. 2004/0056344) discloses multi-chip circuit module and method for producing the same.

Contact Information

Any inquiry concerning this communication or earlier communications from the examiner should be directed to THANH Y. TRAN whose telephone number is (571)272-2110. The examiner can normally be reached on M-F (9-6:30pm).

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Thao X. Le can be reached on (571) 272-1708. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see http://pair-direct.uspto.gov. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

/T. Y. T./
Examiner, Art Unit 2892

/Thao X Le/
Supervisory Patent Examiner, Art Unit 2892

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